

REMARKS

Claims 39-62 remain pending in the present application. Claims 1-38 and 63-64 were previously canceled without prejudice, Claim 59 was amended leaving Claims 39-62 for consideration upon entry of the present Amendment. No new matter has been introduced by these amendments.

Applicant respectfully requests reconsideration and allowance of the subject application in view of the foregoing amendments and the following remarks.

35 U.S.C. § 102(b)

Claims 39-62 stand rejected under 35 U.S.C. §102(b) as being unpatentable over U.S. Patent No. 6,552,744 to Chen. Applicant respectfully submits that claims 39-62 are not anticipated by Chen.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference (see, MPEP § 2131). In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art (see, MPEP § 2112 IV.).

Claim 39

Claim 39 is directed to a method and recites:

A method of rendering a view of a surrounding scene, the method comprising:

determining, for the view to be rendered, a viewing position representing a location of an observer that is observing the surrounding scene; and

*for each pixel in an image to be rendered as a representation of
the view of the surrounding scene,
determining a viewing ray passing through the pixel in a
direction of viewing of the observer, and
selecting which of a plurality of longitudinally adjacent
capture images is to be used to determine a display value for the
pixel.*

Applicant asserts Chen fails to anticipate independent Claim 39 because Chen does not disclose a viewing position representing a location of an observer that is observing the surrounding scene; and determining a viewing ray passing through the pixel in a direction of viewing of the observer. Rather, Chen discloses the orientation of the virtual reality (VR) camera is recorded when a set of discrete images is captured (see, col. 3, lines 38-39). A computer within the virtual reality camera combines the images of the scene into a panoramic image based, at least partly, on the respective camera orientations at which the images were captured (see, col. 2, lines 48-51). The VR camera assists the photographer in determining the camera orientation at which each new discrete image is to be snapped when a region overlap is within target size or automatically determined based upon the camera's angle of view and the distance between the camera and subject (see, col. 4, line 59-63 and col. 5, lines 3-8).

The Office stated "The O/P sensor 21 will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation will determine which of the plurality of longitudinally adjacent capture images will be used to determine the display" (see, Office Action pages 4-5 and 10-11). Applicant respectfully disagrees with this interpretation as Chen discloses the O/P sensor 21 is used to detect the orientation and position of the VR camera, (see col. 3, lines 28-29), not the observer's orientation. Chen also discloses the orientation sensor is monitored by the processor to determine when the next photograph should be snapped (see,

col. 4, lines 57-59) or the camera may be user-configured to automatically snap a photograph when it detects sufficient change in orientation (see, col. 5, lines 1-3). Chen does not anticipate Claim 39 because it does not expressly or inherently disclose each and every element of the claim.

As all elements of independent Claim 39 have not been disclosed, this claim is allowable over Chen. Given that Claims 40, 41, 43, 46-54, and 56-68 depend directly or indirectly from Claim 39, Applicant respectfully submits that Claims 40, 41, 43, 46-54, and 56-58 are likewise allowable over Chen for at least the reasons discussed above with respect to Claim 39.

Claims 42 and 44

Claim 42 is directed to a method and recites in part:

interpolating, based on the plurality of longitudinal image arrays, to determine the display value for the pixel if more than one of the plurality of image arrays is used.

Claim 44 is directed to a method and recites in part:

interpolating, based on the plurality of longitudinal image columns, to determine the display value for the pixel if more than one of the plurality of image columns is used.

Applicant asserts Chen fails to disclose interpolating based on the plurality of longitudinal image arrays or plurality of longitudinal image columns to determine the display value for the pixel. Applicant defines interpolation as “to determine how all these pixels are to be combined to determine the color of the pixel in the observer’s view image” (see Specification at page 36, line 15). An example in the Specification for determining the pixel color for a particular viewing ray is by considering two high images, two columns of the two high images, two cameras from each of the four columns

and two pixels from each of the eight cameras (see Specification at page 36, lines 10-14). Chen does not disclose interpolating as in Claims 42 and 44. Thus, Claims 42 and 44 are not anticipated by Chen.

The Office relies on the theory of inherency that interpolation is used to create the image on the display when zooming (see, col. 7, line 65 - col. 8, line 3). Applicant respectfully disagrees. Chen does not expressly describe "interpolating based on the plurality of longitudinal image arrays or image columns to determine the display value for the pixel". Furthermore, the theory of inherency requires facts and/or technical reasoning to show that the features flow from the teachings of Chen. Applicant asserts the Office presents no technical reasoning and insufficient evidence to support this inherency contention. Applicant respectfully submits that Chen does not anticipate Claims 42 and 44, and that interpolating based on plurality of longitudinal image arrays or columns is not inherent in Chen. Accordingly, the rejection of Claims 42 and 44 is requested to be withdrawn.

Claim 45

Claim 45 is a method which recites:

A method as recited in claim 43, wherein determining which one or more of the plurality of image columns to use comprises:
calculating an angle between the viewing ray and a camera direction at the intersection point; and
identifying the one or more of the plurality of image columns based on the calculated angle.

Applicant asserts Chen fails to disclose plurality of image columns to use comprises: calculating an angle between the viewing ray and a camera direction at the intersection point; and identifying image columns based on the calculated angle. Chen combines the discrete images into the panoramic image by determining a spatial

relationship between the discrete images based on the camera orientation information recorded for each image or based on common features in the overlapping regions of the images or based on a combination of the two techniques (see, col. 5, lines 34-41). As Chen does not disclose each and every element of the claim, these claims are patentable over Chen.

The Office relies on the theory of inherency that the angle between the viewing ray and the original camera direction is calculated in order to determine what portion of the image the viewer is observing (see Office Action, page 3). Applicant respectfully disagrees with this reliance on inherency. Rather, Chen combines the discrete images by determining a "spatial relationship" (see, col. 5, lines 34-41). Chen discloses a spatial relationship is determined between images based on common features in the images is to "cross-correlate" the images (see, col. 5, lines 42-44). The images can be cross-correlated by "sliding" one image over the other image (see, col. 5, lines 46-48). Applicant asserts the Office has not provided a technical basis to reasonably support that calculating the angle between the viewing ray and a camera direction at the intersection point, necessarily flows from the teachings of Chen. Applicant respectfully submits that Chen does not necessarily function in accordance with the method of Claim 45, and that these features are not inherent in Chen. Accordingly, the rejection of Claim 45 is requested to be withdrawn.

Claim 59

Independent Claim 59 has been amended which recites:

One or more computer-readable media having stored thereon a computer program that, when executed by one or more processors of a computer, causes the one or more processors to perform acts including:

determining, for a view of a surrounding scene to be rendered, a viewing position representing a location of a point of view inside the scene, wherein the surrounding scene is defined by a capture

cylinder including a plurality of longitudinal image arrays generated from a plurality of capture images; and

for each pixel in an image to be rendered as a representation of the view of the surrounding scene,

determining a viewing ray passing through the pixel in a direction of viewing of the observer corresponding to the view,

determining an intersection point between the viewing ray and the capture cylinder,

using the intersection point to determine which one or more of the plurality of longitudinal image arrays to use to determine the display value for the pixel,

determining, based on the intersection point, which one or more of a plurality of image columns in each of the one or more of the plurality of longitudinal image arrays to use to determine the display value for the pixel,

determining, based on an elevation angle of the viewing ray, which one or more longitudinally adjacent capture images corresponding to the one or more longitudinal image arrays to use to determine the display value for the pixel,

determining, based on the elevation angle of the viewing ray, which one or more pixels from the one or more longitudinally adjacent capture images from the one or more capture images to use to determine the display value for the pixel, and

determining the display value for the pixel based on the display values of each of the one or more pixels.

Chen does not disclose a viewing ray passing through the pixel in a direction of viewing of the observer corresponding to the view for each pixel in an image to be

rendered as representation of the view of the surrounding scene as recited in amended Claim 59. Therefore, Chen does not anticipate independent Claim 59 because it does not expressly or inherently disclose each and every element of this claim. With respect to Claims 60-62 which depend directly or indirectly from Claim 59, they too are allowable for at least the reasons discussed above. Accordingly, the rejection of Claims 59-62 is requested to be withdrawn.

Conclusion

All pending claims are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the present application.

Respectfully Submitted,

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